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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,833	06/25/2001	Steven Verhaverbeke	004730	2675

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APPLIED MATERIALS, INC.
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EXAMINER	
JOLLEY, KIRSTEN	
ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/891,833	VERHAVERBEKE ET AL.	
	Examiner	Art Unit	
	Kirsten C Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 17* is/are rejected.

7)☒ Claim(s) *11-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments/Amendments

1. The claim objections and 35 USC 112, 2nd paragraph rejections set forth in the prior Office action have been withdrawn in response to Applicant's amendments to the claims.

2. The 35 USC 102(b) rejection of claim 1 over Akimoto et al. and 35 USC 103(a) rejections of claims 1-3 over Blades have been withdrawn in response to Applicant's amendments to claim 1 which require that the measured amount of chemical is used in a semiconductor wafer cleaning process.

3. The 35 USC 103(a) rejections of claims 4 and 6-7 over Blades have been withdrawn in response to Applicant's argument that Blades fails to teach measuring one chemical and then measuring the amount of the chemical and dilutant mixture as claimed by Applicant.

4. The 35 USC 103(a) rejections of claims 11-13 over Toge have been withdrawn in response to Applicant's arguments that Toge fails to describe utilizing two *separate* valve systems having tubes of a known volume. It is noted that claim 11 has been interpreted as requiring that the first and second valve systems are separate.

5. Upon additional search of the claims as newly amended, the prior art of McConnell et al. (US 4,899,767) was found. Claims 1-10 and 17 are newly rejected over the McConnell et al. reference and therefore this action is made non-final.

Claim Objections

6. Claims 1-3 and 11-13 are objected to because of the following informalities: In claim 1, line 2, it appears that the word --in-- is missing after "chemical". In claim 11, line 11, it appears that --water-- is missing after "DI". Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3-4, 7 are rejected under 35 U.S.C. 102(b) as being anticipated by McConnell et al. (US 4,899,767).

McConnell et al. discloses a method of generating a measured amount of a chemical in a semiconductor wafer cleaning process comprising the steps of: flowing a chemical treatment fluid F1, F2, F3, etc. into a valve system comprising measuring tank 32 having a known volume; filling said tube with said chemical to generate a measured amount of chemical; and applying the measured amount of said chemical to a semiconductor wafer (col. 7-8). Measuring tank 32 is long and thin, for example 2 inches diameter by 52 inches length (col. 7, lines 38-40), which meets the limitation of a tube. Because the measuring system of McConnell et al. is operable via a plurality of valves, it meets the limitation of a valve system.

With respect to claim 3, McConnell et al. teaches in col. 12, lines 63-66, that each of the inlet valves is preferably a 3-port valve. Therefore, the valve system of McConnell et al. comprises at least two 3-port valves.

McConnell et al. teaches that its process may be used with *one* or more semiconductor wafers in col. 13, lines 56-57, therefore McConnell et al. discloses a single semiconductor wafer cleaning process.

Alternatively, McConnell et al. also teaches a delivery system for special fluids such as HF comprising two consecutive 3-port valves to accurately control the amount of HF that is injected into a water flow stream in order deliver precise concentrations of HF to the semiconductor cleaning process (Figure 5 and col. 12, lines 9-62). This valve system of Figure 5 necessarily has a known volume, and the described process comprises the steps of filling the tube with a cleaning chemical to generate a measured amount of said chemical and applying the measured amount to a semiconductor wafer in a single semiconductor wafer cleaning process.

With respect to claims 4 and 7, McConnell et al. additionally teaches the steps of flowing DI water into said valve system and pushing the measured amount of chemical into a chamber with said DI water, and continuing to flow said DI water (and chemical) into said chamber until a predetermined level is reached in said chamber.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 2, 5-6, 8-10, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McConnell et al.

As to claims 2 and 6, McConnell et al. lacks a teaching of the use of a 6-port valve in its valve system. McConnell et al. states in col. 6, lines 59-65 that "various multiport two- or three-position valves may be substituted in the loop for certain groups of two or more valves shown in the figures." McConnell et al. also states with regard to Figure 5, "a five port, four way valve may also be used in place of the two three port, 2 position valves" (col. 12, lines 44-46). Therefore, McConnell et al. suggests the replacement of numerous smaller valves with multi-port valves. It would have been obvious to have replaced two 3-port valves of McConnell et al. with a 6-port valve with the expectation of equivalent results since it is known that a 6-port valve may perform the same as two 3-port valve in succession.

With respect to claim 8, McConnell et al. teaches with respect to Figure 5 and col. 12, lines 9-62 a process comprising the steps of flowing DI water into first and second conduits, wherein the DI water in the first conduit flows into the valve system to push the measured amount of chemical into a third conduit, an combining the flow of said measured amount of chemical and said DI water in said third conduit with said flow of DI water in said second conduit, and dispensing said combined flow onto a semiconductor wafer.

Claims 5, 8-10, and 17 lack a teaching of applying the mixed chemical solution to a spinning wafer. McConnell et al. teaches a desire to provide uniform exposure of the wafer(s) treated to the cleaning solution in the process of its invention. It is well known in the semiconductor manufacturing art that spinning of wafers immersed in a treatment solution ensures that all areas of the semiconductor wafer are exposed equally to the treatment solution. It would have been obvious for one having ordinary skill in the art to have spun the

semiconductor wafer(s) while immersed in the various cleaning solutions in McConnell et al.'s process in order to equally expose all areas of the wafer(s).

Allowable Subject Matter

11. Claims 11-13 would be allowable if rewritten or amended to overcome the objection set forth in this Office action. The prior art does not teach or fairly suggest flowing a chemical into a first valve system having a tube of known volume to generate a measured amount of chemical, flowing DI water into a second valve system having a tube of known volume to generate a measured amount of DI water, and flowing an inert gas into both first and second valve systems to push the measured amounts of chemical and DI water into a chamber where the DI water and chemical are mixed together, and where the first and second valve systems are separate.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kirsten C Jolley
Patent Examiner
Art Unit 1762

kcj